

# NEOTYPIFICATION OF *ARTEMISIA CARRUTHII* (ASTERACEAE: ANTHEMIDEAE)

Caleb A. Morse

R.L. McGregor Herbarium  
Division of Botany, Natural History Museum  
and Biodiversity Research Center  
University of Kansas  
2045 Constant Ave  
Lawrence, Kansas 66047-3729, U.S.A.  
cmorse@ku.edu

James L. Reveal

L.H. Bailey Hortorium Herbarium  
Department of Plant Biology  
Cornell University  
412 Mann Library Bldg  
Ithaca, New York 14853-4301, U.S.A.  
jlr326@cornell.edu

## ABSTRACT

Authentic material of *Artemisia carruthii* Alph. Wood ex Carruth was lost after publication of the name. Accordingly a neotype is selected and typification of names now considered synonymous of that species, *A. wrightii* A. Gray, *A. kansana* Britton, *A. coloradensis* Osterh., *A. bakeri* Greene, and *A. pringlei* Greenm. is reviewed with “step 2” lectotypes designated for *A. coloradensis* and *A. bakeri* and a “step 3” lectotype designated for *A. wrightii*.

## RESUMEN

El material original de *Artemisia carruthii* Alph. Wood ex Carruth se perdió después de la publicación del nombre. Por ello se selecciona un neotipo y se tipifican los nombres que ahora se consideran sinónimos de esa especie, *A. wrightii* A. Gray, *A. kansana* Britton, *A. coloradensis* Osterh., *A. bakeri* Greene, y *A. pringlei* Greenm. Se revisan con “paso 2” lectotipos designados para *A. coloradensis* y *A. bakeri* y un “paso 3” se designa lectotipo para *A. wrightii*.

James Harrison Carruth (1807–1896) published three new species attributed to Alphonso Wood in his “Centennial catalog of the plants of Kansas” (1877). The disposition of one of these, *Cyperus spiculatus* Alph. Wood ex Carruth (Cyperaceae), likely a later synonym of *C. erythrorhizos* Muhl., has been discussed by McGregor and Brooks (1982). It is not clear that Carruth actually intended to publish the second species, *Muhlenbergia innominata* Alph. Wood in Carruth (Poaceae) as new to science, rather than merely indicating that Wood had identified it as undescribed. Although it meets the requirements for publication, the description was reproduced almost verbatim from Carruth (1873), where the taxon was first described without an epithet. The status of this name was not addressed by McGregor and Brooks (1982), and the name has been overlooked by other authors. Original material has not been located. The third species, *Artemisia carruthii* Alph. Wood ex Carruth, was published with this statement as its protolog:

481. †*A. Carruthii* sic vult Mr. Wood, nov. sp. Erect, simple, clothed all over in a white tomentum. Leaves pinnately parted, with linear segments, the lower bipinnately, with leafy, axillary tufts, all close-pressed, 1' [inch] and less long. Heads oblong, small, 1" [line], 7-lined flowered, homogamous, all condensed in a narrow, spike-like panicle. Plant 1–2 feet.

Carruth did not cite type material or place of collection, and the species is not figured in the publication. Here, we discuss the source and fate of the original material, which appears to have been lost around the time of publication. To fix application of the name, we designate a neotype.

In an 1892 letter to Bernard B. Smyth (1843–1913), Carruth suggests that original material was in existence at the time he published these names, reporting that he had sent “several specimens to [Wood]”, and that names published in his 1877 list were based on those specimens (Carruth 1892). That Carruth took pains to indicate that the description of *Artemisia carruthii* was his own and not merely transcribed from correspondences from Wood, as he did in the case of *Muhlenbergia innominata*, suggests that a least one set of specimens was in his possession at or near the time of publication. However, original material was almost certainly not collected by Carruth himself. Carruth (1877) noted that he had “not traveled widely, but [was] greatly aided by the observations of others.” Carruth was stationed in Lawrence, Kansas, at the time

of the publication of his Centennial Catalogue, and it does not appear that he made any excursions to the western half of the state prior to 1881 (Carruth 1879, 1881), when he reported having travelled as far west as Barton County (Carruth 1881–1882). As a consequence, many of the taxa included in his floristic lists of 1872, 1873, 1874, and 1877 were based on submissions contributed by a “corps of observers” (Carruth 1873). Carruth incorporated into his lists reports of species provided by these observers, but he also received hundreds of specimens for determination, and it is likely that the first specimen of *A. carruthii* was taken by one of several collectors who lived in or traveled through western Kansas in the 1870s.

Carruth frequently failed to cite collectors of voucher specimens by name, but did include a station for most specimens, from which it is often possible to deduce the donor. Unfortunately, the usual citation of a place of collection is omitted for *Artemisia carruthii*. Of the individuals who had collected in the western part of the state prior to its publication, Carruth reported receiving specimens from areas within the range of *A. carruthii* from three individuals: the paleontologist Benjamin Franklin Mudge (1817–1879) is credited with contributing five specimens from “S. W. Kansas” and “W. Kansas” (Carruth 1872, 1877); Louis Watson (1817–1894), a medical doctor and cousin of Sereno Watson (1826–1892), is presumed to have taken most if not all of the specimens Carruth recorded from Ellis, Ellis County (Carruth 1873, 1874, 1877) and contributed “400 to 500 species, often many of each” (Carruth 1877); and Francis Huntington Snow (1840–1908), Professor of Natural History (and eventually Chancellor) at the University of Kansas, and his students were credited with specimens and observations from Russell County among other stations (Carruth 1874, 1877). A single specimen from Ellis attributed to a collector cited as “L’Her” (Carruth 1877) is presumed here to be a typographical error. Interestingly, Edwin Alonzo Popenoe (1853–1913), professor at Kansas State Agricultural College, who traveled throughout the western part of the state and on whose authority Carruth (1877) credits stations in fourteen counties, seems to have contributed only reports of species, but no specimens (Carruth 1873, 1874, 1877).

Carruth’s own herbarium was reputed to be poorly maintained and disposed of when he departed Lawrence in 1892 (McGregor & Brooks 1982), and any material in existence is likely to have been discarded at that time. However, it is possible that he had deposited some specimens in one of several botanical institutions in the state. In addition to serving as state botanist, Carruth held appointments as Professor of Natural History at Baker University in Baldwin City and as a lecturer at Washburn University in Topeka (McGregor & Brooks 1982), and he may have deposited some vouchers in the botanical collections of either institution. In addition, a small number of specimens collected by Carruth, Snow, and Watson remains at KANU, and a few collected by Snow and Watson remain at KSC; several specimens gathered by Watson are also at GH. Alphonso Wood’s herbarium and types were deposited at NY sometime after his death in 1879 (Stafleu 1967), although material from his herbarium has been identified in other institutions.

Whatever the fate of Carruth’s holdings of *Artemisia carruthii*, it appears that the material was lost to students of the Kansas flora soon after publication. The name seems to have fallen into obscurity almost immediately after Carruth’s departure from Kansas. It was overlooked by authors of subsequent compilations of, and novelties to, the flora of the state. *Artemisia carruthii* was not included in the treatments of Kellerman and Kellerman (1888), Smyth (1889, 1892b), or Hitchcock (1899), or listed among the 145 species excluded by Smyth (1890). Smyth (1892a, 1892b) cited *A. wrightii* A. Gray for several Kansas counties and later (1898) suggested that *A. kansana* Britton “may be a form of *A. frigida*,” which he had previously cited (Smyth 1890, 1892a, 1892b) for stations outside the range of that species in Kansas. Indeed, no early specimens deposited in KANU, KSC, or WASH were determined by the collectors to be *A. carruthii*, these being variously named *A. filifolia* Torr., *A. frigida* Willd., *A. kansana*, or *A. wrightii* as late as 1931. That Smyth, who corresponded rather extensively with Carruth, did not even discuss *A. carruthii* suggests that he had not seen original material in Kansas herbaria, particularly KSC and WASH, which he was likely to have examined during the preparation of his floristic lists.

*Artemisia carruthii* was first resurrected for the Missouri flora by Mackenzie (1902), who listed *A. kansana* as a synonym without comment. In the ensuing debate about the correct name for this taxon, no type

material was cited—most likely because it was not seen—by Rydberg (1910), Britton and Brown (1913), Hall and Clements (1923), Bush (1928), Gates (1939), or Keck (1946). Notable among these authors were Britton and Brown, whose listing of *A. carruthii* as only a questionable synonym of *A. kansana* suggests that Britton had not seen material at NY referable to *A. carruthii* at the time of publication. Hall and Clements discuss *A. carruthii* at length, but—unusual for these authors—also do not cite a type specimen. Acknowledging that *A. carruthii* was the earliest available name for the element they recognized as a subspecies of *A. vulgaris* L., Hall and Clements (1923) nevertheless chose to employ Asa Gray's epithet in publishing the combination *A. vulgaris* var. *wrightii*, citing the earlier name as “not well established” (p 81), commenting (p. 82) that Gray “did not intend to establish a species distinct from *A. carruthii*, the earlier publication of which he apparently overlooked.” Results of biosystematic studies by Ray (1971) and Bol (1984) supported Keck's (1946) circumscription of *A. carruthii*, and most authors of recent floras and checklists have accepted the name (e.g. Martin & Hutchins 1981, Barkley 1991, Cronquist 1994, Jones et al. 1997, Welsh 2003, Kaul et al. 2006, Voss 1996, Yatskievych 2006, Shultz 2006). However, none of these authors have resolved typification of the species. It was not accepted by Ling (1995), who treated *A. wrightii* as having priority, apparently based on an error transcribing the publication date of the latter name.

*Artemisia carruthii* is broadly distributed from the southwest Great Plains through the eastern part of the Great Basin, New Mexico, Arizona, and northern Mexico (Shultz 2006), and it is reported to be adventive in Michigan (Voss 1996) and Missouri (Yatskievych 2006). Welsh (2003) and Shultz (2006) reported that *A. carruthii* intergrades with *A. ludoviciana* Nutt., so it is important to fix application of the name by selecting a type. The senior author attempted in October 2007 and January 2008 to locate original material of *A. carruthii* for designation as a lectotype. Requests to identify specimens collected in Kansas in or before 1880 were sent to staff at Baker University, FHKSC, ISC, KSTC, GH, NY, PH, and YU. Holdings at KANU, KSC, and WASH were examined by the senior author; holdings at MO were examined on the authors' behalf by Craig Freeman (Curator, KANU). These searches proved unsuccessful, and it seems doubtful that original material remains. Consequently, a neotype is designated below in accordance with Art. 9.15 of ICBN (McNeil et al. 2006). Following the taxonomic circumscription first proposed by Keck (1946) and accepted by subsequent authors, we also discuss the typification of names considered synonymous of *A. carruthii*, designating “step 2” lectotypes for *A. coloradensis* Osterh. and *A. bakeri* Greene, and a “step 3” lectotype for *A. wrightii* (discussed by McNeil et al. [2006] in Art. 9, Ex. 8, and by Anderson [2007]).

*Artemisia carruthii* Alph. Wood ex Carruth, Trans. Kansas Acad. Sci. 5:51. 1877. *Artemisia vulgaris* L. var. *carruthii* (Alph. Wood ex Carruth) F.C. Gates, Trans. Kansas Acad. Sci. 42:138. 1939. TYPE: UNITED STATES. KANSAS. Hamilton Co.: 3.25 mi N, 3.5 mi W Syracuse, S side of Hamilton County State Fishing Lake & Wildlife Area, T23S R41W sec 28 SE¼ of NE¼, 38.02517°N, 101.81783°W, elev. 3340 ft, disturbed shortgrass prairie on eroded, W-facing slopes along Plum Creek below dam, 9 Oct 2007, C.A. Morse 16097 (NEOTYPE: KANU sheet 361746, designated here; DUPLICATES OF THE NEOTYPE: BH, BRIT, BRY, COLO, CS, FHKSC, ISC, K, KANU, KSC, KSTC, GH, MEXU, MICH, MO, ND, NEB, NY, OKL, OKLA, PH, RM, TEX, WASH, WIS, US, UTC, YU).

*Artemisia wrightii* A. Gray, Proc. Amer. Acad. Arts 19:48. 1883. *Artemisia vulgaris* L. subsp. *wrightii* (A. Gray) H.M. Hall & Clem., Publ. Carnegie Inst. Washington 326:80, pl 9. 1923. *Artemisia vulgaris* var. *wrightii* (A. Gray) E.J. Palmer & Steyerem., Ann. Missouri Bot. Gard. 22:677. 1935. *Artemisia carruthii* var. *wrightii* (A. Gray) S.F. Blake, J. Washington Acad. Sci. 30:472. 1940. TYPE: UNITED STATES. NEW MEXICO. Grant Co.: Santa Rita del Cobre, 1851, C. Wright 1279 (LECTOTYPE: a first step lectotypification designated by Standley [1910: 218] as “type,” here corrected; NY, a second step lectotypification designated by Hall and Clements [1923: 81] as “type,” here corrected; NY sheet 158580, a third step lectotypification, designated here; DUPLICATES OF THE LECTOTYPE: GH [three sheets annotated by Asa Gray as *A. wrightii*], NY, US).

*Artemisia kansana* Britton, N.L. Britton & A. Brown, Ill. Fl. N. U.S. 3:466. 1898. TYPE: UNITED STATES. KANSAS. Lane Co.: plains, 15 Aug 1895, A.S. Hitchcock 302 (HOLOTYPE: NY; ISOTYPES: GH, KSC, RM, US).

*Artemisia coloradensis* Osterh, Bull. Torrey Bot. Club 27:506. 1900. *Artemisia wrightii* var. *coloradensis* (Osterh.) A. Nelson, New Man. Bot. Centr. Rocky Mts. 568. 1909. TYPE: UNITED STATES. COLORADO. Larimer Co.: Dale Creek, 7 Sep 1899, G.E. Osterhout 2010 (LECTOTYPE: RM, a first step lectotypification designated by Keck [1946: 440] as “type,” here corrected; RM sheet 170628, a second step lectotypification designated here; DUPLICATES OF THE LECTOTYPE: NY, POM, RM [2 sheets]).

*Artemisia bakeri* Greene, Pl. Baker 3:31. 1901. *Artemisia mexicana* Willd. ex Spreng. var. *bakeri* (Greene) A. Nelson in New Man. Bot. Centr. Rocky Mts. 569. 1909. TYPE: UNITED STATES. COLORADO. Montrose Co.: canyon of the Gunnison River near Cimarron, Aug 1896, E.L. Greene s.n. (LECTOTYPE, a first step lectotypification designated by Hall and Clements [1923: 81] as “type,” here corrected;

ND-G sheet 062066, a second step lectotypification designated here; DUPLICATE OF THE LECTOTYPE: ND-G).

*Artemisia pringlei* Greenm., Proc. Amer. Acad. 40:50. 1904. TYPE: MÉXICO. CHIHUAHUA: plains near Chihuahua, 11 Sep 1885, C.L. Pringle 625 (LECTOTYPE: GH designated by Hall and Clements [1923: 81] as “type,” here corrected; DUPLICATES OF THE LECTOTYPE: DS, NY [2 sheets], PH, US).

## Notes

Standley (1910) merely restricted application of *Artemisia wrightii* to the Wright collection, whereas Hall and Clements (1923) designated one of two specimens at NY as the “type.” A more logical choice would have been one of the three sheets annotated by Gray at GH. We hereby restrict the choice to a single sheet at NY.

Keck annotated a duplicate of *Osterhout 2010* (171095) as the “type” perhaps because the original Osterhout specimen (170628), marked with a small, red, preprinted label with the word “Type” was not seen by Keck in 1939. Because there were three sheets of *Osterhout 2010* at RM prior to 1946, however, we consider Keck’s actions a first step lectotypification as he did not distinguish between the three sheets. It should be noted that Hall and Clements (1923) did not cite collection information of *Artemisia coloradensis*, other than to remark (p. 82) “Type locality, near Dale Creek, Larimer County, Colorado.” This by itself does not qualify as an effective lectotypification.

Hall and Clements (1923: 81) stated that the type of *Artemisia bakeri* “was collected by Greene in the canyon of the Gunnison, near Cimmaron, Colorado. This has not been seen [by us], but the above notes are based upon other specimens cited by Greene, namely, Black Canon, Gunnison Watershed, Colorado, *Baker 698* (Gr, UC, US).” As they did not indicate where the Greene specimen was to be sought, our second step lectotypification completes their designation of the lectotype.

## ACKNOWLEDGMENTS

We thank James Estes, Craig Freeman, and Leila M. Shultz for reviewing the manuscript and providing helpful comments. Carolyn Beans (GH), Roger Boyd (Baker University), Tom Eddy (KSTC), Alina Freire-Fierro (PH), Barbara Hellenthal (ND), Jill Larson (RM), Deborah Lewis (ISC), Mark Mayfield (KSC), Melissa Rossow (NY), Patrick Sweeney (YU), Joe Thomasson (FHKSC), and Mark Allen Wetter (WIS) supplied data on the holdings at their respective institutions. Craig Freeman (KANU) examined holdings at MO. In addition, John Boggan (US), Carolyn Beans, Mark Mayfield, and Melissa Rossow kindly provided images of type specimens not already available through their institution’s website. Lisa DeCesare (Botany Libraries, Harvard University) and Marie Long (Mertz Library, New York Botanical Garden) searched their holdings for correspondence between Carruth and Wood. Ronald Hartman (RM) provided insights into the annotation history of Osterhout’s types. Vic Landrum provided both information about and access to the collection at WASH. Curators of KSC, ND, RM, and WASH kindly provided specimen loans. The senior author’s fieldwork was made possible through an anonymous contribution to the McGregor Herbarium endowment.

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